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U.S. Army Toxic and Hazardous Materials Agency



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## Enhanced Preliminary Assessment Report:

Manchester Army Housing Units  
Manchester, Connecticut

October 1989

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prepared for

Commander  
U.S. Army Toxic and Hazardous Materials Agency  
Aberdeen Proving Ground, Maryland 21010-5401

prepared by

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<p>Argonne National Laboratory has conducted an enhanced preliminary assessment of the Army housing property located in Manchester, CT. The objectives of this assessment include identifying and characterizing all environmentally significant operations, identifying areas of environmental contamination that may require immediate remedial actions, identifying other actions which may be necessary to resolve all identified environmental problems, and identifying other environmental concerns that may present impediments to the expeditious sale of this property.</p>				
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## SUMMARY

The Manchester military housing facility located in Manchester, Conn., presents no imminent or substantial threat to human health or the environment. There is no evidence to suggest that hazardous or toxic constituents have ever been released from this property. No immediate remedial actions, therefore, are warranted for the site.

Although these housing units were originally developed in conjunction with a Nike missile battery, available documentation and circumstantial evidence indicate that the housing property was wholly independent of the battery's operational activities. No Nike-related wastes were delivered to this property for management or disposal. Furthermore, since this property was independent of the Nike missile operations with respect to all necessary utilities, there is no possibility of migration of Nike-related wastes along buried utility lines. Nevertheless, two potential environmental impacts from this property have been identified, and these are deserving of further attention.

One potential environmental impact involves the above-ground fuel-oil storage tanks. The exteriors of these tanks appear not to have an adequate protective coating, and areas of rust were observed on some of them. An adverse environmental impact can be anticipated should these tanks remain in service in their present condition. Adding to this concern is the possibility that the effectiveness of the concrete containment box beneath each tank would be compromised if the drainage tap on the box were to remain in the open position for an extended period of time.

A second concern is the recurrent problem with the sanitary sewer-distribution system at the point of lowest elevation in the housing site. Untreated liquid waste backed up into the housing unit nearest to this low point. The occupant indicated that the sewer line needed to be cleaned out more frequently.

The following actions are recommended prior to the release of this property:

- Assure the integrity of the fuel-oil storage tanks, treat for rust, and apply a proper protective coating.
- Develop and implement a solution to the possibility of containment-box drainage taps being inadvertently left in the open position.
- Develop and implement a remedy for the sewer-system problem that plagues unit #37.

The above recommendations are based on the assumption that this property will continue to be used for residential housing.





## 1 INTRODUCTION

In October 1988, Congress passed the Defense Authorization Amendments and Base Closure and Realignment Act, Public Law 100-526. This legislation provided the framework for making decisions about military base closures and realignments. The overall objective of the legislation is to close and realign bases so as to maximize savings without impairing the Army's overall military mission. In December 1988, the Defense Secretary's ad hoc Commission on Base Realignment and Closure issued its final report nominating candidate installations. The Commission's recommendations, subsequently approved by Congress, affect 111 Army installations, of which 81 are to be closed. Among the affected installations are 53 military housing areas, including the Manchester housing area addressed in this preliminary assessment.<sup>1</sup>

Legislative directives require that all base closures and realignments be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA). As a result, NEPA documentation is being prepared for all properties scheduled to be closed or realigned. The newly formed Base Closure Division of the U.S. Army Toxic and Hazardous Materials Agency is responsible for supervising the preliminary assessment effort for all affected properties. These USATHAMA assessments will subsequently be incorporated into the NEPA documentation being prepared for the properties.

This document is a report of the enhanced preliminary assessment (PA) conducted by Argonne National Laboratory (ANL) at the Army stand-alone housing area in Manchester, Conn.

### 1.1 AUTHORITY FOR THE PA

The USATHAMA has engaged ANL to support the Base Closure Program by assessing the environmental quality of the installations proposed for closure or realignment. Preliminary assessments are being conducted under the authority of the Defense Department's Installation Restoration Program (IRP); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 91-510, also known as Superfund; the Superfund Amendments and Reauthorization Act of 1986, Public Law 99-499; and the Defense Authorization Amendments and Base Closure and Realignment Act of 1988, Public Law 100-526.

In conducting preliminary assessments, ANL has followed the methodologies and procedures outlined in Phase I of the IRP. Consequently, this PA addresses all documented or suspected incidents of actual or potential release of hazardous or toxic constituents to the environment.

In addition, this PA is "enhanced" to cover topics not normally addressed in a Phase I preliminary assessment. Specifically, this assessment considers and evaluates the following topical areas and issues:

- Status with respect to regulatory compliance,
- Asbestos,
- Polychlorinated biphenyls (PCBs),
- Radon hazards (to be assessed and reported on independently),
- Underground storage tanks,
- Current or potential restraints on facility utilization,
- Environmental issues requiring resolution,
- Health-risk perspectives associated with residential land use, and
- Other environmental concerns that might present impediments to the expeditious "excessing," or transfer and/or release, of federally owned property.

## **1.2 OBJECTIVES**

This enhanced PA is based on existing information from Army housing records of initial property acquisition, initial construction, and major renovations and remodeling performed by local contractors or by the Army Corps of Engineers. The PA effort does not include the generation of new data. The objectives of the PA include:

- Identifying and characterizing all environmentally significant operations (ESOs),
- Identifying property areas or ESOs that may require a site investigation,
- Identifying ESOs or areas of environmental contamination that may require immediate remedial action,
- Identifying other actions that may be necessary to address and resolve all identified environmental problems, and
- Identifying other environmental concerns that may present impediments to the expeditious transfer of this property.

### 1.3 PROCEDURES

Connecticut military housing records located at Fort Devens, Mass., were reviewed during the week of May 15-19, 1989. Additional information was obtained on July 17, 1989, from the Family Housing Office located at the Navy and Marine Corps Reserve Center, New Haven, Conn., and from an interview on July 20, 1989, with the Area Facilities Engineer at his office in Windsor Locks, Conn. A site visit was conducted at Manchester, Conn., on July 20, 1989, at which time additional information was obtained through personal observations of ANL investigators and discussions with a site occupant. Photographs were taken of the housing units and surrounding properties as a means of documenting the condition of the housing units and immediate land uses. Site photographs are appended.

All available information was evaluated with respect to actual or potential releases to air, soil, and surface and ground waters.

Access to individual housing units was obtained through the senior occupant at the facility. ANL investigators revisited the property on September 10, 1989, at which time the interiors of all but six of the houses (units #37, 49, 60, 69, 93, and 112; Nike Circle) were inspected.

## 2 PROPERTY CHARACTERIZATION

### 2.1 GENERAL PROPERTY INFORMATION

The Manchester housing property, located in the town of Manchester in Hartford County in north central Connecticut, contains 12.98 acres of land in fee, 0.18 acres in easements, and a road permit from the Town of Manchester.<sup>2</sup> Figures 1 and 2 show the general location of the facility.

The housing units were developed in 1958, and were recently renovated.<sup>3</sup> No additional major construction has taken place on the property since it was developed.

### 2.2 DESCRIPTION OF FACILITY

Figure 3 shows the site plan of the housing property.

#### Housing Units

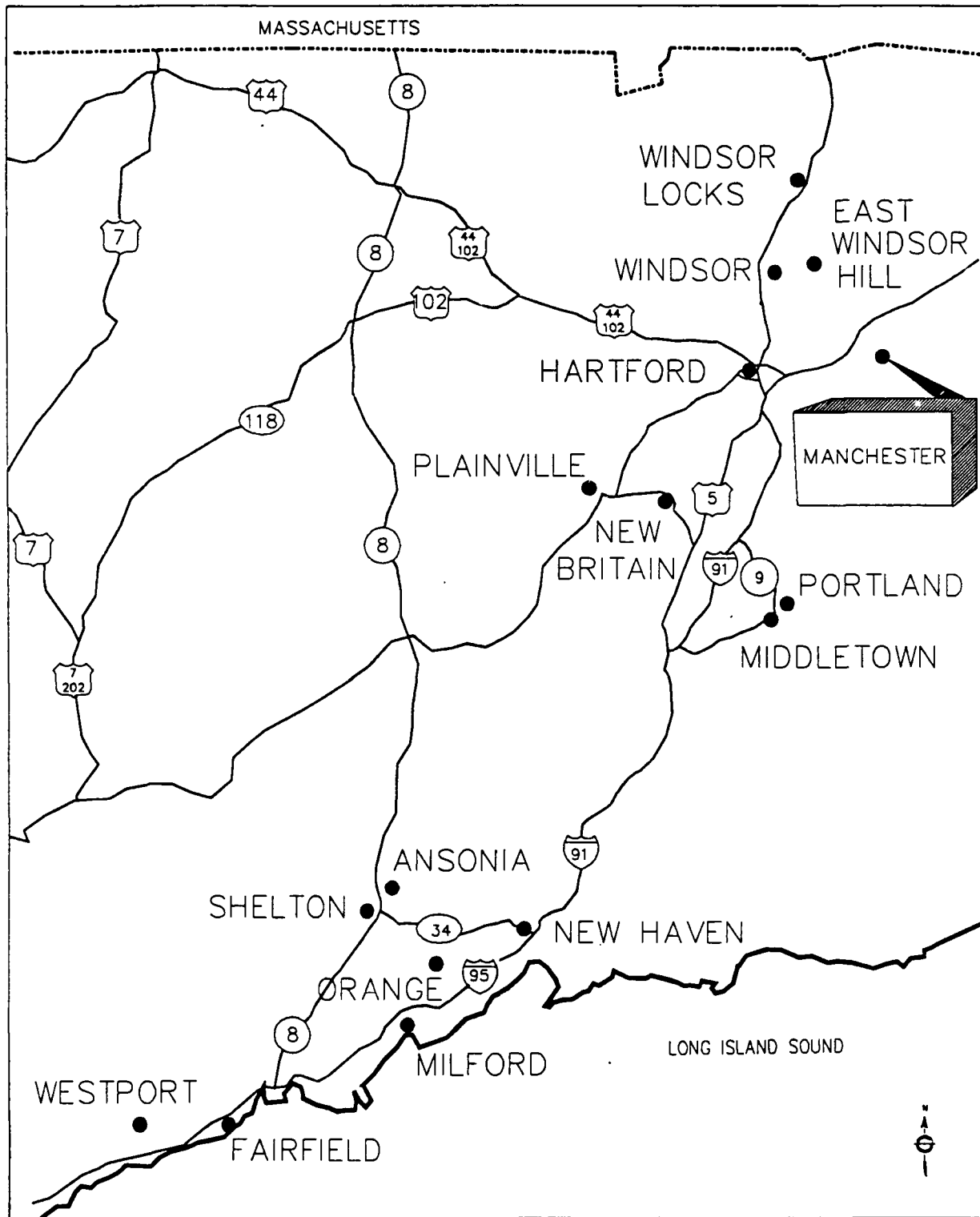
The Manchester military housing facility comprises 32 wood-frame, one-story, three-bedroom, single-family houses built on concrete slabs. Capehart is the model name assigned to these houses by the builder, National Homes. Thirteen of the units have carports attached.

#### Utilities

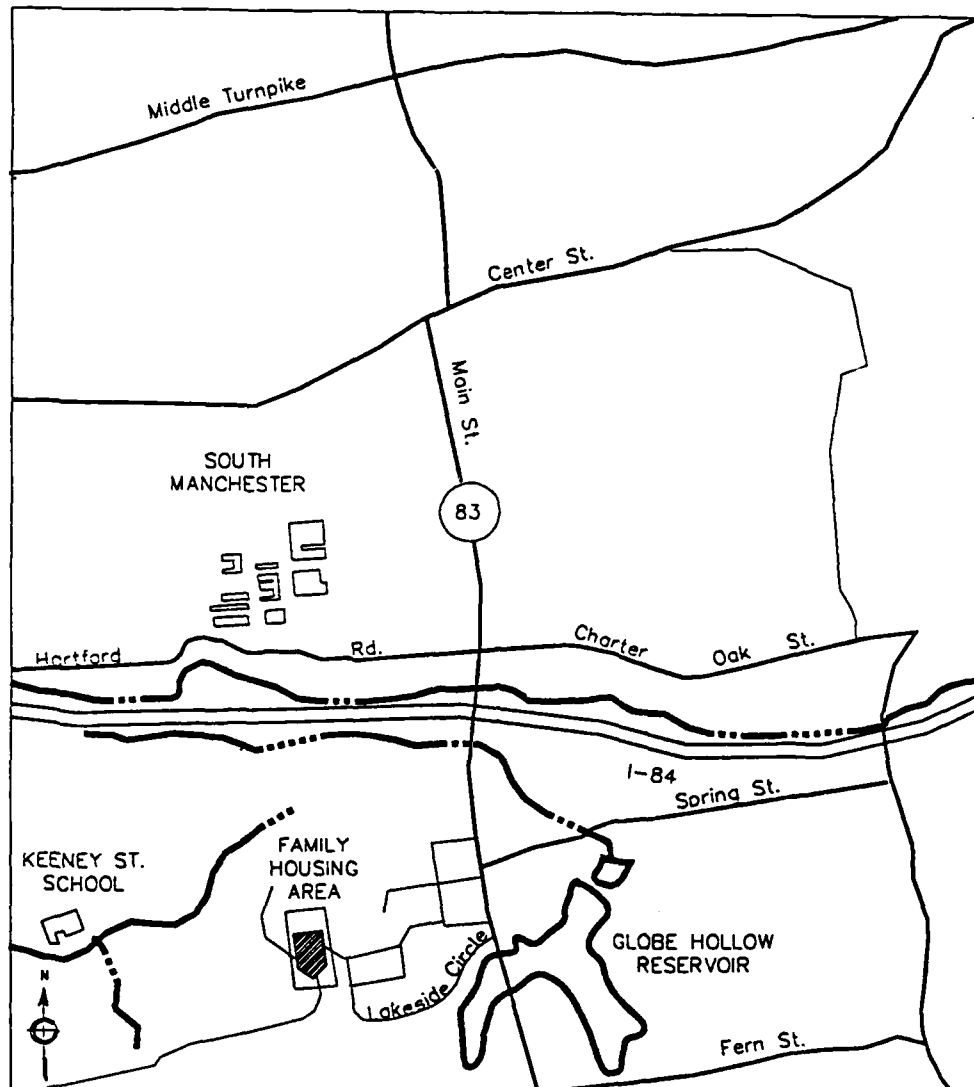
The housing units are connected to the town water department's distribution system, and no drinking water wells exist on the property. Likewise, the electrical distribution system for the property is connected to the local power company's distribution system. However, according to the Area Facilities Engineer, all water and electrical lines, utility poles, and electrical transformers on the property are owned by the U.S. government, which is responsible for maintaining them. Therefore, the cost of repairs made to the property's utility distribution systems by public utility personnel is borne by the government. There is no record of testing of the transformers for the possible presence of PCBs. There was no evidence of spills or leaks from these transformers. Solid wastes are removed from the property by a private contractor.

#### Sewage

The housing facility's government-owned sewage distribution system is connected to the town of Manchester's sanitary sewer system. There is an on-site lift station at the northern end of the housing property.



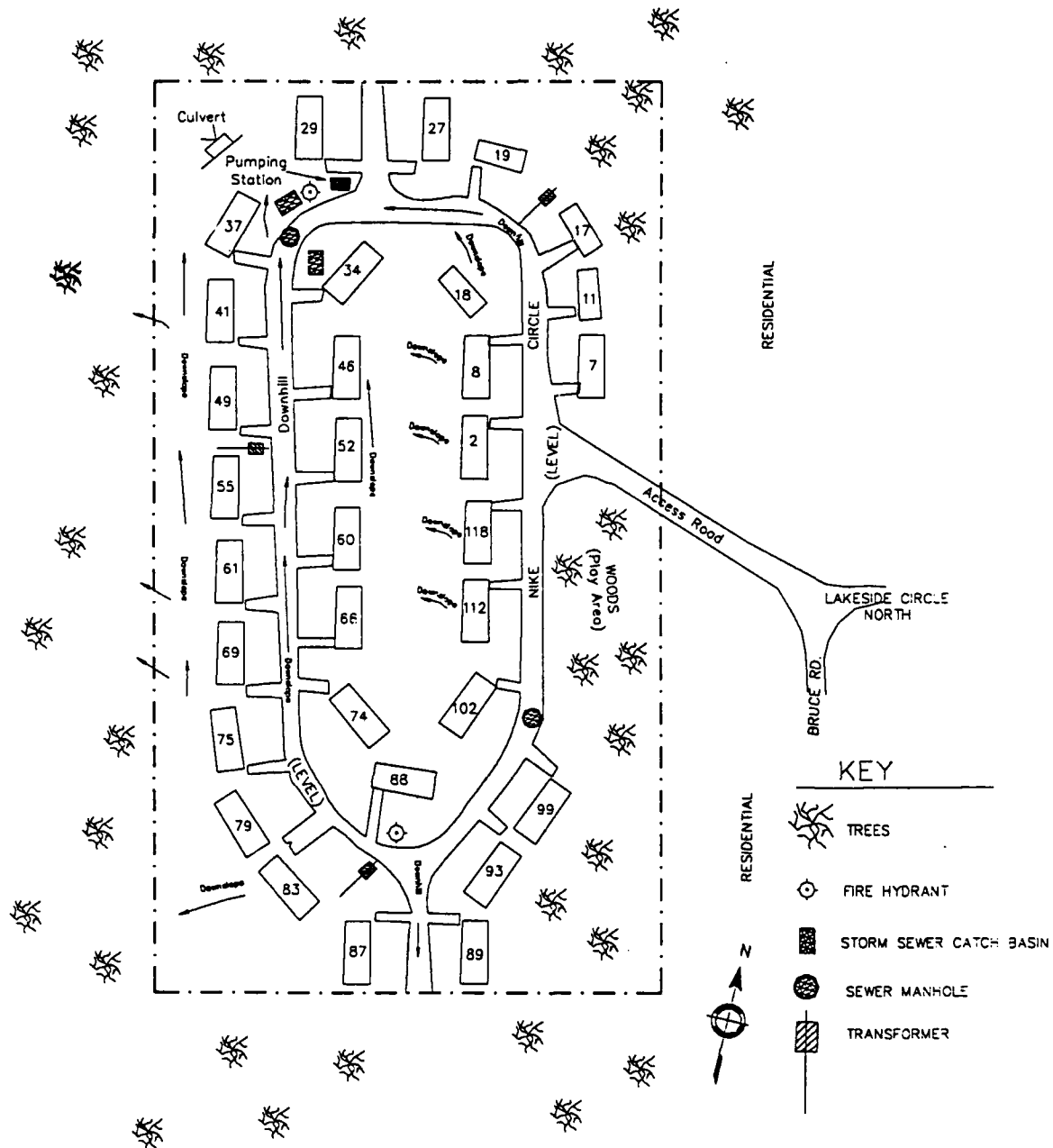
**FIGURE 1 Location Map of Connecticut Army Housing Facilities**



**FIGURE 2 Vicinity Map of Manchester Army Housing Units**

### **Fuel Storage**

Each unit has a new above-ground, 275-gallon, fuel-oil storage tank located in the rear of the unit. Concrete containment boxes underlie the recently installed tanks. The containment boxes are at ground level above the former locations of the original underground storage tanks, which were removed. This tank replacement was contracted approximately two years ago through the Army Corps of Engineers, New York District. There is no record of releases of petroleum products from the original underground tanks. Rather, their replacement was a matter of good engineering practice, dictated by their advancing ages.



**FIGURE 3 Site Plan Map of Manchester Army Housing Units**

### **Storm Drainage Systems**

The property drains to the west and northwest into two catch basins located at the northwest corner of the site through a culvert that discharges at the edge of a wooded area.

### **Other Permanent Structures or Property Improvements**

Other than recent renovations to the housing units, there are no other permanent structures or property improvements.

## **2.3 PROPERTY HISTORY**

### **2.3.1 Nike Defense Program and Typical Battery-Level Practices**

Generic information on the national Nike antiaircraft defense program has been compiled in two studies, one commissioned by the Army Corps of Engineers<sup>4</sup> and the other by the U.S. Army Toxic and Hazardous Materials Agency.<sup>5</sup> In both studies, independent contractors relied on information contained in unclassified documents related to the Nike surface-to-air missile program, including engineering drawings and specifications (for the facilities and the missiles themselves), interviews with Army personnel participating in the Nike program, and operations manuals and directives relating to the operations and maintenance of Nike facilities. Taken together, these two reports represent the most complete assemblage of generic information on the Nike missile program from an environmental perspective. Salient points from both reports are condensed below.

At its zenith in the early 1960s, the Nike program included 291 batteries located throughout the continental United States. The program was completely phased out by 1976, with many of the properties sold to private concerns or excessed to state or local governments for nominal fees.

Nike Ajax missiles were first deployed in 1954 at installations throughout the continental United States, replacing, or in some cases augmenting, conventional artillery batteries and providing protection from aerial attack for strategic resources and population centers. Typically, Nike batteries were located in rural areas encircling the protected area. The Ajax was a two-stage missile using a solid-fuel booster rocket and a liquid-fuel sustainer motor to deliver a warhead to airborne targets.

The Ajax missile was gradually replaced by the Nike Hercules missile, introduced in 1958. Like the Ajax, the Hercules was a two-stage missile, but it differed from the Ajax in that its second stage was a solid-fuel rather than liquid-fuel power source and its payload often was a nuclear rather than conventional warhead. Ajax-to-Hercules conversions occurred between 1958 and 1961 and required little change in existing Nike battery facilities. A third-generation missile, the Zeus, was phased out during development and consequently was never deployed.



A typical Nike missile battery consisted of two distinct and separate operating units, the launch operations and the integrated fire control (IFC) operations. The two operating areas were separated by distances of less than two miles, with lines of sight between them for communications purposes. A third separate area was also sometimes part of the battery. This area was typically equidistant from the two battery operating sites and contained housing for married personnel assigned to the battery. Occasionally, these housing areas also contained battalion headquarters, which were responsible for a number of Nike batteries.

Depending on area characteristics and convenience, the housing areas were often reliant on the launch or IFC sites for utilities such as potable water, electrical power, and sewage treatment. In those instances, buried utility lines connected the housing area to one or both of the other battery properties. It is also possible, however, that housing areas were completely independent of the missile launcher and tracking operations. In those instances, the necessary utilities were either maintained on the housing site or purchased from the local community. In many localities, as the character of the land area around the housing units changed from rural to suburban or urban, communities extended utility services to the housing unit locations, in which case conversions from independent systems to community systems were made.

A large variety of wastes was associated with the operation and maintenance of Nike missile batteries. Normally encountered wastes included benzene, carbon tetrachloride, chromium and lead (contained in paints and protective coatings), petroleum hydrocarbons, perchloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene. Because of the rural locations of these batteries, and also because very few regulatory controls existed at that time, most of these wastes were managed "on-site." (Unused rocket propellants and explosives, however, would always have been returned to central supply depots and not disposed of on-site.) It is further conceivable that wastes generated at one of the Nike properties may have been transferred to its companion property for management or disposal.

Wastes related to missile operation and maintenance would not have been purposely transferred from a battery operating area to a housing area with no facilities for waste management or disposal. In some instances, however, the sewage treatment facilities for all Nike battery properties were located at the housing area; that possibility cannot be automatically ignored. Finally, where housing areas received various utilities from either of the operating areas, it is also possible that wastes disposed of on those other properties may have migrated to the housing area via the buried utility lines. And since decommissioning of the Nike batteries did not normally involve removal of buried utility or communication lines, any such contaminant migration is likely to have gone unnoticed.

### **2.3.2 Manchester Housing Units**

The Manchester housing area was developed in 1958 as a stand-alone housing facility for military personnel assigned to the Nike missile battery located in Manchester, Conn. Thirty-two single-family houses were erected on the housing-facility property. Since the initial property development in 1958, no other permanent structures

have been added and none of the original structures has been razed. However, renovations have been made, including the installation of smoke and heat detectors in each unit in 1979; and more recently, new vinyl siding installed over the original cedar shakes, new roofs, gutters, and downspouts, new above-ground fuel-storage tanks replacing the original underground tanks, new heating systems, new windows, and new kitchens and bathrooms.

## **2.4 ENVIRONMENTAL SETTING AND SURROUNDING LAND USE**

The housing facility, containing 13.16 acres including easements, is located in a thinly settled area of the town of Manchester. A private residential area borders the eastern boundary of the property, while woodlands surround the remaining borders. The town of Manchester is east of the city of Hartford and has an estimated 1986 population of 49,000.<sup>6</sup>

## **2.5 GEOLOGIC AND HYDROLOGIC SETTINGS**

Manchester is located in the Upper Connecticut River Basin of the New England Upland Section of the New England Physiographic Province. The 508 square miles of the upper Connecticut River Basin in north-central Connecticut include the basins of four major tributaries: the Scantic, Park, and Hockanum rivers, and the Farmington River downstream from Tariffville. Precipitation over this area averaged 44 inches per year during 1931-1960. In this period, an additional 3,800 billion gallons of water per year entered the basin in the main stem of the Connecticut River at the Massachusetts state line; about 230 billion gallons per year in the Farmington River at Tariffville; and about 10 billion gallons per year in the Scantic River at the Massachusetts state line. Some water was also imported from outside the basin by water-supply systems. About half of the precipitation, 22.2 inches, is lost from the basin by evapotranspiration; the remainder flowed out of the area in the Connecticut River at Portland. There are 30 principal lakes, ponds, and reservoirs in the Upper Connecticut River basin. Two of them have usable storage capacities of more than 1 billion gallons. Floods have occurred within each month of the year but in different years. The greatest known flood on the Connecticut River was in March 1936; it had a peak flow of 130,000 cubic feet per second at Hartford. Since then, major floods have been reduced by flood-control measures.<sup>7</sup>

The major aquifers underlying the basin are composed of unconsolidated materials (stratified drift and till) and bedrock. Stratified drift overlies till and bedrock in valleys and lowlands in the eastern and western parts, and in most of the broad central valley. The stratified drift generally ranges in thickness from 10 feet in small valleys to more than 200 feet in the Connecticut River Valley. Bedrock underlies the entire basin and is composed of (1) interbedded sedimentary and igneous rocks and (2) crystalline rocks.

Groundwater sources yield from several million gallons per day from large well fields to 1 gallon per minute (gal/min) from single wells. Yields of 100 gal/min or more are most commonly obtained from screened wells tapping stratified-drift aquifers. Small

to moderate water supplies can generally be obtained from any of the aquifers. Wells in bedrock yield at least a few gallons per minute at most sites. The probability of obtaining an adequate yield for domestic supply is greater in sedimentary than in crystalline bedrock and is also greater in stratified-drift overburden than in till.

Where unaffected by man's activities, the water, which is of the calcium magnesium bicarbonate type, is generally low to moderate in dissolved-solids concentration, and ranges from soft to hard. In general, stream flow is less mineralized than groundwater, particularly when it consists largely of direct runoff. However, streams become more highly mineralized during low-flow conditions, when most flow consists of more highly mineralized water discharged from aquifers. The median dissolved-solids concentration in water from 25 stream sites was 113 milligrams per liter (mg/L) during high flow, and 148 mg/L during low flow. Iron and manganese occur naturally in objectionable concentrations in some streams draining swamps and in some waters draining from sedimentary bedrock that contains iron- and manganese-bearing minerals.

Man's activities have affected the water quality of streams in much of the area, particularly in the Hockanum and Park River basins. The degradation of quality in these streams is shown by wide and erratic changes in dissolved-solids concentration, excessive amounts of trace elements, a low dissolved-oxygen content, and abnormally high temperatures. Groundwater within this area is degraded principally by induced infiltration of surface water that contains chemical wastes, by leachate from wastes stored or disposed of on the ground, and by effluents discharged from septic tanks.<sup>7</sup>

The quantity and quality of water are satisfactory for a wide variety of uses, and, with suitable treatment, the water may be used for most purposes. The total amount of water used in 1968 was more than 100 billion gallons. About 80% of this was used for industrial purposes, and 90% of the industrial water was obtained from surface-water sources. About 85% of the population was supplied with water for domestic use by 15 major public and municipal systems, and 25 private associations. Analyses of water from the 13 largest systems show generally good quality.

### 3 ENVIRONMENTALLY SIGNIFICANT OPERATIONS

#### 3.1 SANITARY SEWER SYSTEM PROBLEMS

In April 1989, the government-owned on-site sewer main became plugged, causing sewage to back up into housing unit #37. About 2 inches of untreated liquid waste covered the floors of the bedrooms, closets, bathroom, utility-room hallway, and kitchen.<sup>8</sup> The problem was not attributable to negligence on the part of the occupants of the unit. The plugging occurred in the main leading to the lift station, but it was not mentioned whether the lift-station pumps were implicated. A conversation with the occupant of unit #37 revealed that the occupant calls the Housing Office whenever a bad odor is detected, and workers come to the site and clean out the sewer main. The occupant indicated that there were no other problems of consequence at the housing facility.

#### 3.2 FUEL-OIL STORAGE TANKS

A canopy affixed to the house a few feet above the new above-ground 275-gallon fuel-storage tank located in the rear of each unit provides marginal protection from the elements. The tanks appear to have been coated with primer only and not to have been coated with an adequate protective finish. Frequently observed small areas of rust on the tanks reinforce this perception. Moreover, a rupture and leakage of oil from a similar above-ground storage tank at another Connecticut military housing facility has been reported.<sup>9</sup> Therefore, continued use of these tanks in their present condition may entail a significant environmental risk.

Potential risk to health might also attach to the collection of rainwater in the containment box beneath each storage tank if the water is allowed to stagnate. On the other hand, if the occupant of a housing unit opens the containment-box drainage tap to release rainwater but forgets to close it, the effectiveness of the box in containing an oil leak would be compromised should a tank rupture occur.

#### 3.3 ASBESTOS-CONTAINING MATERIALS

Vinyl asbestos floor tiles were used in the original construction of the housing units. The Area Facilities Engineer confirmed that the insulation on water pipes in the utility rooms of the units contains asbestos. However, no significant deterioration of these materials was observed. Floor tiles were all found to be in good condition.

#### **4 KNOWN AND SUSPECTED RELEASES**

There are no known major releases or impacts to the environment from the Manchester housing facility. No hazardous wastes or hazardous materials are stored on site. However, the sanitary sewer backup into unit #37 entailed a health risk to the occupants. This problem may reoccur.

## 5 PRELIMINARY ASSESSMENT CONCLUSIONS

Although these housing units were originally developed in support of a Nike missile battery located in Manchester, there is no evidence that wastes associated with the operation or maintenance of the battery were delivered to or managed at this property. Furthermore, the housing facility would appear to have been independent of the battery's launch and fire control operations with respect to water, sewer, and electrical utilities. No documentary evidence was found of utility connections between the housing site and the other battery properties.

Although the above-ground tanks were installed with a cement containment trough around them, the effectiveness of containing a possible oil spill is compromised with the common practice of leaving the spigots to the troughs left in the open position. These tanks were installed with only a primer paint coating, and this does not allow adequate protection from adverse weather conditions over an extended period of time. Some corrosion was observed.

Despite independence from Nike battery operations, this property could adversely affect the environment if the above-ground fuel-oil storage tanks that service the housing units were to remain in their present potentially unsafe condition. It should be recognized also that the concrete containment box that underlies each storage tank would be rendered ineffective if the drainage tap of the box were to remain open for an extended period of time.

The sanitary sewer backup in unit #37 exposed the occupants to a health risk, and conceivably entailed a potential for contamination of groundwater, especially in light of the generally high water table present in the area.

Floor tiles, which also may contain asbestos, were found to be in good condition. No deterioration of water-pipe insulation, which also may contain asbestos, was observed.

## 6 RECOMMENDATIONS

The Manchester housing facility presents no imminent or substantial threat to human health or the environment. There is no evidence to suggest that hazardous or toxic constituents have ever been released from this property. No immediate remedial actions, therefore, are warranted for the site. Nevertheless, three potential environmental impacts from this property have been identified that need to be further addressed.

One potential environmental impact derives from the continued use of the inadequately protected above-ground fuel-oil storage tanks and their associated concrete containment boxes. The integrity of these relatively new storage tanks should be confirmed, and following treatment for existing rust, protective coatings should be applied to the exteriors of the tanks. With respect to containment-box drainage taps, a method should be devised to ensure that they do not remain in the open position for extended periods of time.

The problem with plugging in the sanitary sewer system should be corrected before another sewage backup incident occurs.

These recommendations assume that this property will most likely continue to be used for residential housing.

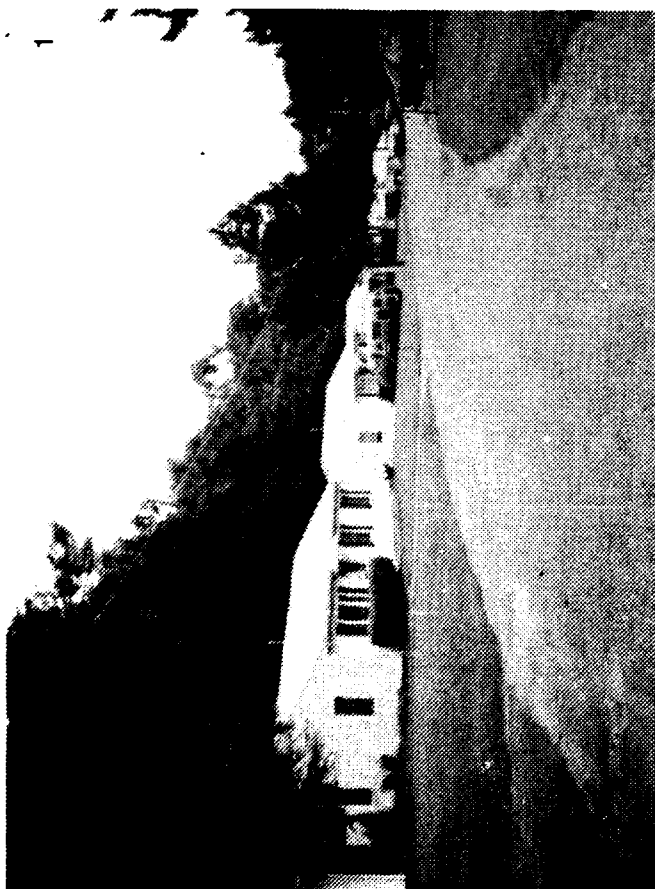
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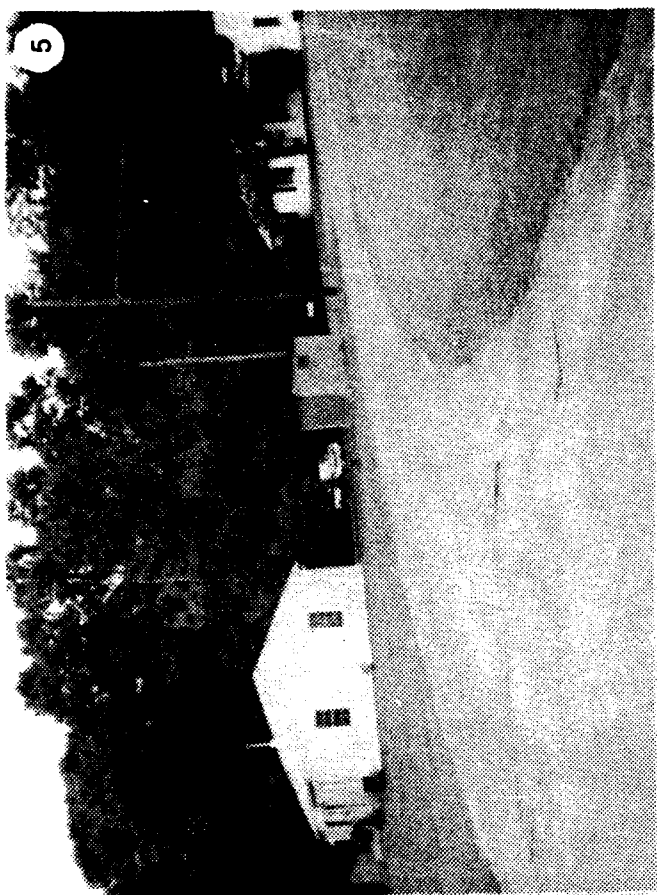
1. *Base Realignments and Closures*, Report of the Secretary's Commission (Dec. 1988).
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9. *Enhanced Preliminary Assessment Report, Ansonia Army Housing Units, Ansonia, Connecticut*, Office of Environmental Management and Surveys, Environmental Research Division, Argonne National Laboratory, Argonne, Ill. (Oct. 1989).



**APPENDIX:**  
**PHOTOGRAPHS OF MANCHESTER HOUSING FACILITY**  
**AND SURROUNDING LAND**







**IDENTIFICATIONS OF PHOTOGRAPHS**

1. A view from southern section of Nike Circle, looking downhill and northwest; housing units at left are #69 (foreground), #61, and #55.
2. Housing unit #118, with an attached carport; of the 32 units at this site, 13 have carports.
3. A view to the south on Nike Circle from the front of unit #118; a playground (not in photograph) is located in the wooded area at left.
4. An electrical transformer atop a utility pole in front of unit #17; transformers on this property are maintained by the federal government.
5. Housing units #29 (left) and #27 (right) at the northern section of Nike Circle; the small structure between these two houses is the septic-system lift station; unit #37 (not shown), at left of unit #29, had sewer system backup problems.